

Z88 EPROM

March 1991

Vol.5 No.2

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Club Addresses

All articles for Z88 EPROM and any membership matters (except Software Library) should be sent to:

ROY WOODWARD
Z88 USERS' CLUB
68 WELLINGTON STREET
LONG EATON
NOTTINGHAM
NG10 4NG

All requests for software from the Club Software Library, (but not special offers), items for inclusion in the Library, and EPROMs for erasure should be sent to:

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THE SOFTWARE LIBRARY
Z88 USERS' CLUB
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GUILDFORD
SURREY
GU1 3PL

Please note that the Library address is the one to use when sending for a list of Library programs - this list is not available from the main Club address. Be sure to enclose £1 plus a SAE for the list.

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The Club CLI Library is run by:

MICHAEL HEY
18 WOODSIDE ROAD
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NOTTINGHAM
NG10 5GP

Any CLI's for the Library, requests for CLI's and the list of CLI programs (42p in stamps) should be sent to Michael Hey.

ALWAYS include your Membership Number with any correspondence. This is not just to be awkward - now the Club is large it can be very time-consuming searching the database for a member's number. Your number is printed on the address label of each issue of Z88 EPROM. Please be sure to enclose a stamped-addressed envelope with anything needing a reply.

Editorial

I would imagine that the members of longer standing among you will by now be used to my wide variety of excuses for this magazine being late. You may have noticed that this issue is even later than has become the custom in the past! I do apologise for this, but it has unfortunately been beyond my control.

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At the end of February, when this issue was being prepared, I hurt my back which left me bedridden for more than a fortnight, and recovery has been painfully slow so far. Even now I find I am restricted to sitting up for only a short time, before the pain becomes too much, and I have to rest flat on my back. I am taking eight pain-killers a day, and visiting my osteopath regularly, but despite this my recovery is taking longer than in the past.

You will appreciate that it is almost impossible to use a Z88 when you are flat out, and so progress on the magazine has been awfully slow. For this reason this issue has not been DTP'd to the usual high standard of presentation - I assumed that you would rather have something, however presented, than nothing at all! I won't dwell any longer on my health problems, suffice to say that the magazine is here now, and I shall do my utmost to get another one out very soon after this, so that we can soon be back on schedule. I should also like to apologise to those of you who are waiting for the complete index mentioned in the last issue. My back troubles meant I did not get this completed as expected, but rest assured that it will be on its way to you soon.

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Spares

Financial matters first. You will all be aware that Mr Lamont slapped another 2.5% onto VAT in his recent Budget, which unfortunately has to be reflected in the prices we charge for spares etc. By far the biggest increase is on keyboards - these have increased to £29.95, due in part to extra VAT, but mostly due to CCL more than quadrupling the price of keyboard membranes in one fell swoop. You will be glad to know that the magazine subscription is zero-rated, and so is unaffected. You will find the new spares prices in this issue. I have decided to absorb the VAT increase on Club binders, as I am conscious that they are already rather expensive, and I don't wish to price them beyond members' reach. Please note that the Developers' Notes and Z88 manual prices are unchanged, as these too are zero-rated.

There is still no sign as I write of the long-awaited Z88 displays from CCL - you may remember that these have been on order since last November - I wonder if the order will make the six-month mark before being delivered? As well as displays I am now also running out of several case parts, so I must ask for your continued patience if you have ordered these components.

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- EP Fetch - From the Z88 User Group library, allows Filer-like access to EPROM files.
- Squeeze - From Rakewell, the latest Z88 application. Gives password protection and file compression. See Rakewell advertisement elsewhere in this issue for details.

IMPORTANT SAVINGS

Existing owners of RangerLink, Diskfiler, PC Link and Squeeze can save £20.00 + VAT for each program EPROM returned at the time of their RangerWorld order, for a maximum saving of £80.00 + VAT! Please note that each EPROM (and cable/disk if appropriate) MUST be returned with the order - this offer is not retrospective.

To order your RangerWorld, simply send £175.38 (including UK postage and VAT) or quote your Visa or Access number with expiry date. For each program returned, deduct £23.00.

* These programmes are only available on RangerWorld.

RangerDisk for Z88 User Club Members

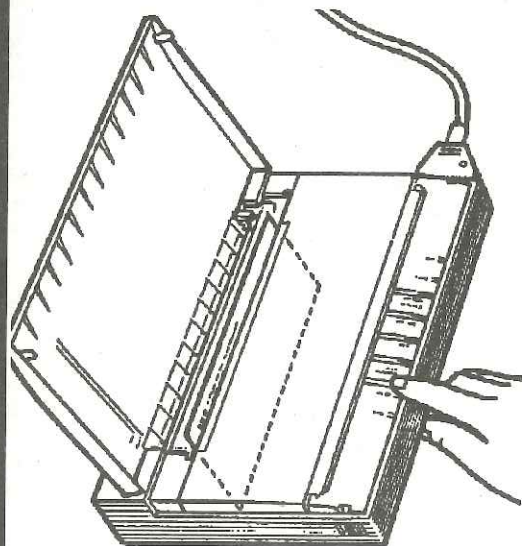
RangerDisk - 3.5", 720 K PC compatible disk drive for Z88 - transforms Z88 into a truly practical personal computer. Following negotiations with the Z88 User's Club, we are now pleased to announce a special price arrangement for members of the club for a limited period only.

To qualify for the special price of only £365.00 + VAT (normal price £450.00 + VAT), you must be a current member of the User's Club and be purchasing RangerDisk for your personal use. Proof of current membership of the User's

Club is required with your order. This offer is subject to availability of stock, so please do not delay.

is

To order your RangerDisk, simply send either £424.93 (including parcel post and VAT) or £432.40 (including next day delivery to most of UK and VAT). P.S. This offer includes the User Club library on disk FREE OF CHARGE.



A laser printer in your pocket? Well, not quite, but the new **Canon BJ10e bubble jet printer** has resolution as good as some lasers and prints real black on white, banishing the fuzzy grey on white of older portable printers to the dustbin of history!

BJ10e has a variety of built in fonts and can be used with both Z88 and desktop PC's. An optional sheet feeder holds up to 30 sheets for long documents.

BJ10e is now priced at only £299.00 + VAT and is available from stock. The optional sheet feeder is £54.00 + VAT and the battery pack is £39.00 + VAT. Shipping is £4.50 + VAT (parcel post) or £11.00 + VAT (next day).

RANGERLINK

The RangerLink high performance PC communications package is available as an upgrade for PC Link II user. The existing PC Link II programs are returned, together with the file conversion facilities.

RangerLink provides file transfer at up to 4 times the speed of PC Link II and batch file transfers. To order your upgrade to RangerLink, simply return your existing PC Link II Eprom and Disk together with £37.38 (£30 + £2.50 p&p + VAT).

OTHER PRODUCTS

Sorry, no room available this month! However, our latest newsletter and price list are available. Please write or phone for your FREE copy.

Please note that all prices exclude VAT. We accept official orders from qualifying UK companies and government organisations. All others, cheque or P.O. with order please. Alternatively, you can order by telephone quoting either Visa or Access (Mastercard) number. Next day delivery available on all items, subject to stock, £11.00 in most of UK. Please call for freight costs to Scotland, offshore or overseas.

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Price - £39.95 excluding VAT - Send £47.94 (including £2.00 p+p) TODAY

Rakewell Ltd., FREEPOST MK1000, Blechley, Milton Keynes. MK1 1YX England. 140% is given as an example only. Compression of 15% to 49% have been achieved on a PipeDream file - the amount of compression will depend on the file.

• SqueezeZ~88 is the subject of a trademark.

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On a more positive note, I have managed to get hold of a small quantity of Z88 circuit boards which have been stripped out of machines. These are not new, but have been tested and are guaranteed for 3 months. Price, including VAT and delivery, is £60. These boards, by the way, are fully populated with chips, and basically need a working keyboard, display and case to make a complete Z88. As I explained, stocks are limited, and orders will be fulfilled on a strict first-come first-served basis. If your order is received after the boards have sold out, your cheque will be returned uncashed.

Canon BJ10e Printer

While on the subject of hardware, I have recently been using a Canon BJ10e bubblejet printer with varying success in conjunction with my Z88. For those of you not familiar with this relatively new printer, it uses a variation on the well-tried inkjet printing technique used in printers by Hewlett-Packard and Diconix. The big difference between the old generation of inkjets and this new Canon is in the print quality - it uses 64 ink nozzles to give a very crisp print, almost approaching the quality of a laser printer.

I said the results with the Z88 have been mixed because I have come across an

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intermittent problem where the printer locks up at random when used with the Z88. There seems to be no definite way to unlock the printer either - usually swapping the Z88 parallel lead for another unit does the trick, but not always. I suspect that the problem lies with the combination of the Z88 parallel interface lead, and the interface on the printer, in much the same vein as the problem with the Toshiba Expresswriter we reported on last year. Even though I suspect the problem is of a similar nature, the cure is not. Both of my serial leads have the extra resistor fitted, which stops the problem with the Toshiba, but the Canon still locks up.

What I would like to know is if anyone else using this printer is suffering from a similar problem, and if anyone has contacted Canon or CCL or their supplier about it. This is a fantastic printer, ideally suited to the Z88, but until we get to the bottom of this problem, I'm afraid it can't be recommended for use with the Z88.

Floppy Disks

In the past few months several people have suggested that the Club ought to sell blank floppy disks to members. I suppose this is understandable since many people now use

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their Z88 with a disk drive, or in conjunction with a PC which uses disks. I had been reticent to try this, mainly because the disk market is so very competitive, but I have finally bowed to the demand! I have decided initially to limit the new service to just 3.5" disks, but if the demand is high there is no reason why it should not be extended to 5.25" in the future.

The disks I have chosen are 3.5" DSDD unbranded, supplied in individual plastic sleeves, with labels. Although not marked, these top quality disks are from a reliable source, and are actually made by KAO, Europe's biggest manufacturer of floppy disks. The disks are fully guaranteed 100% certified - any fault, and the disk will be replaced immediately.

Prices, including VAT and carriage, are as follows:

10 x 3.5" DSDD	£8.00
20 x 3.5" DSDD	£14.00
50 x 3.5" DSDD	£29.00
100 x 3.5" DSDD	£49.00

Workshop

Finally, the Workshop which is being held at Milton Keynes on Saturday 1st June. As expected, ticket sales so far have been pretty dire. What I would like to see is a massive increase in interest - remember, the Workshop is perhaps the best way to learn anything you want to know about your Z88. All the experts will be at your disposal - what more could you ask? Tickets can be obtained from the Long Eaton Club address on page 2, price £3.50 each. I will also include details on how to find the venue, together with details of local hotels for those wishing to make a weekend of it.

That's all the Editorial for this time. I intend to follow up with the April issue as soon as possible, and any contributions for that magazine would be gratefully received.

Contributions to Z88 EPROM

As you may remember, in the past I have suggested that people sending in contributions are far better to send them in on EPROM or floppy disk, rather than a paper copy. This is because if a paper copy is all I receive, I then have to spend time re-typing the article - time which I generally find I don't have.

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The end result of this is that many articles which are sent in on paper never get published. despite my previous requests, I still get many articles on paper, so I have decided to try another way.

If you have EPROM or disk, please send your articles on these as usual. In the case of EPROMs, the file will be copied and the EPROM returned to you. I generally hang on to disks, mainly because these days the cost of the disk is often less than the return postage, but if you would like your disk back, just say so and I will be happy to oblige. For those of you without disk or EPROM, send me a paper copy of your article in the usual way. If the article is suitable for publication, I will send you a Club EPROM and ask you to save the file onto this, and then return the EPROM to me. So, remember. If you are writing an article, print out a copy, but keep the text in your Z88, so that you can then save the file to my EPROM if required. I would be grateful if those of you with your own EPROMs and disks would continue to use them, as I only have a small number of Club EPROMs, and I don't want a backlog to build up. Get those articles written, now!

Software Review: SqueeZ~88

Squeeze is a new application for the Z88 from Rakewell - authors of that marvellous book, Z88 Magic. This is, I believe, the first software package that Rakewell have produced. As well as being able to buy Squeeze as a stand-alone package from Rakewell or other Z88 dealers, you can also get it included with the RangerWorld multi-application chip. (See last issue's Newslines for more details.)

What is the point of Squeeze? It really has two main functions. Primarily, Squeeze can be used to process files held in your Z88 to make them use up less valuable RAM. This is ideal if you store a lot of files on your Z88 and are constantly running out of memory, because with Squeeze, you can compress all the files to release some memory, and un-squeeze the files when you want to work on them.

The other major use of Squeeze, which will probably only matter if you use your machine in business, is file security. As we all know, the Z88 has no protection to prying eyes - anyone can switch on the machine, and look at all your secrets.

PipeDream

PipeDream is now available for the IBM PC and compatibles, and the Acorn Archimedes. It has been completely rewritten for these computers and contains many new facilities, whilst retaining complete file and keyboard compatibility with the Z88.

PipeDream on the PC or Archimedes makes the ideal companion for your Z88. With just a connecting lead and the PC LINK II EPROM you can load files directly from the Z88 filing system into PipeDream on the other computer and continue working with no loss of information. Now you can use PipeDream on the computer in your home or office as well as using it in the Z88.

New features of PipeDream on the PC and Archimedes include:

- ◆ up to 8192 columns and over 500,000,000 rows (depending upon your computer's memory size)
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PipeDream for the IBM PC and PipeDream for the Acorn Archimedes costs £99 + VAT.

For more information or to order PipeDream call us on 0954 211472 or write to us at Colton Software, Broadway House, 149-151 St Neots Road, Cambridge CB3 7QJ. Access and VISA telephone orders welcome.

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Z88 Reference Manual	M-Tec	16.00
Z88 Software Developers Guide	Cambridge Comp.	40.00
Using your Z88	Patrick Hall	10.00

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Squeeze allows you to select a password before you compress a file, and as the program processes the file it also scrambles it according to the password you have chosen. Once a file has been scrambled in this way, it is totally secure, and even if someone took a copy of the file, they could never decode it unless they knew your original password. You do know your password (don't you?), and you simply enter this when you come to un-squeeze the file, and hey presto!

Rakewell's Squeeze for the Z88 uses a standard form of file compression, which means the compressed files it produces can be un-squeezed by a compatible program on another computer. To this end, Rakewell can supply a PC version of Squeeze. Using this, you can compress files on the Z88, transfer them using PC Link, (or my favourite, RangerLink), and then un-squeeze them as required on the PC. The advantages of working like this are many - the files take up less space on the Z88; because they are smaller they transfer more quickly to the PC; and of course they also take up less space on the PC!

Once Squeeze has been installed on your Z88 (which must have at least 128k expansion in slot 1, by the way), it can be selected using [J]U. (U for what, I ask?)

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You are then presented with three windows across the Z88 screen, (a la RangerLink or Ranger's DiskFiler, which betrays the origin of the software's author.) The small window on the left gives all the commands, the centre window shows a directory of the current device/directory, and the right-hand window shows the Squeeze directory, which is by default where squeezed files are placed. This can be altered if desired, but the manual points out that it is wise to keep squeezed files in a separate directory to avoid getting them confused with un-squeezed files.

Using Squeeze is very simple. Files in either window can be marked either singly, selectively, or all together as a whole directory, and selecting the command you require does the rest. The program gives you an on-screen "running commentary" of its progress, including how many more files it has got to process after the one it is currently acting on. Squeezes files will have the same filename as the original version, but the second letter of the filename extension will be changed to a Q. (If you squeeze a file which has no filename extension, Squeeze adds its own - ".ZSQ".

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The manual is, by the way, excellent. So often software is accompanied by a few photocopied sheets of "instructions", and even if the content is reasonable, so often the presentation leaves a lot to be desired. Not so with this program - the manual is an A5 horizontal format booklet of 35 pages, properly typeset and printed. It's about time one or two other Z88 software suppliers took a leaf out of Rakewell's book (or should that be manual?) when it comes to documentation. Because it is really essential to use directories on the Z88 if you are using Squeeze, the manual even gives the reader a whirlwind guide on how directories work.

One interesting point that the manual does mention is that squeezing a file may make it bigger! Because of the way the squeezed files are stored, short files under 2k might actually end up bigger than they started out, and because of this Squeeze will not normally even try and compress any file shorter than 512 bytes.

I won't go into any detail on how Squeeze works its magic, as following this review is an article by Andy Berry at Rakewell, who explains how these compression programs work far more clearly than I ever could!

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A couple of interesting "bonus" commands are included in Squeeze. "Look at Z88 File" allows you to view files within Squeeze - very useful for checking on the contents of PipeDream files without having to load them into PipeDream first. The other useful addition is a complete re-work of the Z88 Copy command. If you have ever tried to copy groups of files from one directory to another, you will know how confusing and difficult the Filer's Copy command can be. In Squeeze it is purely a case of selecting the two devices and directories you want to deal with, marking the files you want to copy, and pressing enter!

I was pleasantly surprised by the speed of Squeeze in use. Vic Gerhardi of Rakewell had told me in the early stages of the programs development that he was hoping the final program would be quite quick at un-squeezing files, but that he expected it to be fairly slow at the initial squeezing. This, I'm glad to say, is not the case. The program processes the files impressively quickly, and more often than not, the resulting compressed file is indeed smaller than the source file. The exact amount of compression varies from file to file, and as you will read in Andy Berry's article, the amount of compression is really dependant on the

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content of the original file. To give you some idea of the speed and effectiveness of Squeeze, below I have compiled a table which illustrates typical values of time and compression for different types of files:

File Type	Length		Time to	
	Before	After	Squeeze	Un-Squeeze
PD Text	13305	8635	12.1sec	6.8sec
PD Text	2285	1683	5.2sec	1.8sec
PD Spread	3172	1800	5.7sec	2.1sec
BASIC Prog	27037	21166	29.7sec	11.0sec

As you can see from the above table, the file compression that Squeeze achieves is quite good, but does vary from file to file. In general, large text files seem to give the best reduction in size, and BASIC files the least. While testing Squeeze and in the time since then when I have actually been using it, I must have processed about 1 megabyte of files with the program, and so far it has worked faultlessly, and has always been able to recover the squeezed file back to its original state.

Squeez~88 costs £39.95 + VAT + carriage.

How Does SqueeZ~88 Work?

Andy Berry - Rakewell Ltd

We know that it seems strange that you can compress any of your files and then restore them to their original state with all the data exactly as it was. How does SqueeZ~88 perform this magic?

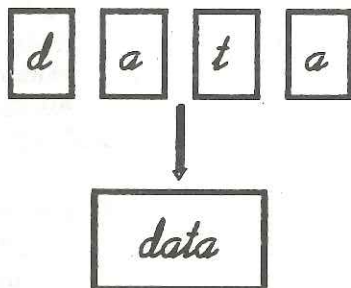
You do not need to understand the internal operation of SqueeZ~88 in order to use it - all the magic is performed behind the scenes. You only see that your Z88 can store more information after you have Squeezed some files!

Concepts

Each character (that is, each letter or number or punctuation mark in text or in Pipedream formulae) can be said to be stored in a box called a "memory location" in the Z88. Each box is just big enough to hold any character that the Z88 can handle, so they are all the same size.

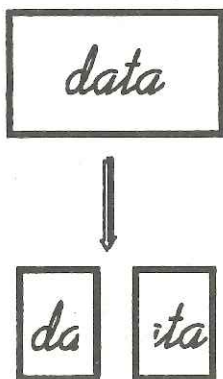
Before we explain how SqueeZ~88 works, it is worth mentioning that the space bar and "Enter" key are treated the same way as other characters (as are the characters which indicate "end-of-page" and so on). So, whereas a document as printed might have lines and pages, the Z88 handles the complete file as a continuous stream of characters spread out, as it were, right across the page. This means that SqueeZ~88 need not worry about the layout of the document.

In effect, SqueeZ~88 replaces the individual character boxes with a continuous stream of writing, rather like the picture below:



As you can see, the joined up writing takes less space - just what is needed to save valuable space on your Z88.

Having joined up the writing we then need to split it into parts, each of which will fit into one of the memory locations in the Z88:



Note how the characters no longer match the boxes - one box can hold parts of one, two or even more characters.

Down to Details...

Of course, it is not quite as simple as that... For example, how does Squeez-88 decide where one character end and the next begin? That is a bit like deciding whether "mm" is "mm" or "nnnn" or whatever. Squeez-88 uses a "decoding tree" - this is explained later.

Then, there is the important issue of deciding how much "width" to allocate for each character. In written English, this is determined by the shape of each character - a "m" is wider than an "i". But Squeez-88 has no such restrictions - it can choose how to write each character to reduce the total "width" (eg, memory) used by each complete file.

The technique it uses can be expressed simply as:

"Choose the width of each character so that the most frequently used ones consume the least memory"

Like all good ideas, this is obvious once it is written down! It explains why SqueezZ-88 has to look at the file twice when it is Squeezing it - the first time is to determine how frequent each character is and the second is then to output the joined up writing.

To explain why SqueezZ-88 needs "decoding trees", we must explore how the squeezed data is stored in your Z88.

How data is stored

As has been often said in the past, computers cannot understand anything other than "on" or "off". If we use the convention of showing on and off by 1 and 0, then after we have squeezed a file, "data" may look like that shown below:

data
:110:010:10:010:

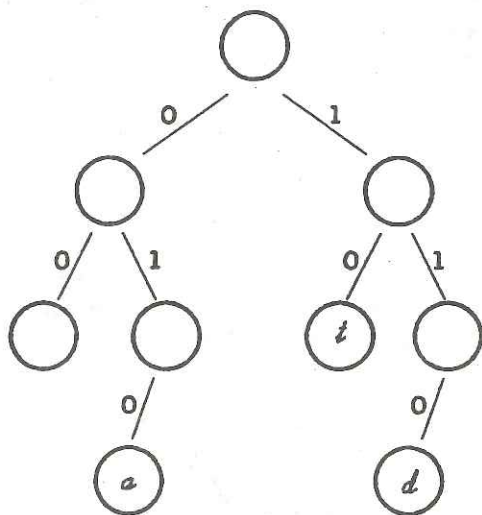
Actually, this pattern of "1" and "0"s only makes sense if this is an extract from a larger file which contains more "t"s than "a"s or "d"s otherwise the rule about the "width" of each character being related to its frequency is broken and the file could be compressed better.

So, we have ended up with this stream of data: 11001010010. We will now see how this stream of numbers can be restored to meaningful data using a decoding tree.

The Decoding Tree

"Trees" are much beloved of computer scientists. Like the green and brown variety, computer trees have roots, branches and leaves. For some obscure reason, they are normally drawn upside down - with the root up in the air and the leaves pointing downwards. If you use directories on your Z88, you are probably already familiar with trees - even if you never knew it.

The decoding tree used for our file would look similar to:



The method used for restoring a Squeezed file is based on the following steps:

- At the beginning of the file, and after each character is restored, look at the root of the decoding tree.
- For each bit in the file, follow the appropriate branch of the tree. That is, take the "left" branch for a 0 and the "right" branch for a 1.
- If the branch leads to a leaf which contains a character, then save that character in the restored file. Return to the root of the decoding tree.
- Otherwise, remember the position in the decoding tree and get next bit from the Squeezed file.

For those of you with a suspicious nature, you can "play computer" and confirm that following these steps does indeed recover the word "data" from the apparently random stream of bits given above. You will find that you are at the root of the tree at the start of a character, on a branch in the middle of the tree in the middle of a character and at a leaf when a complete character has been decoded.

For optimum compression, each Squeezed file requires its own decoding tree and so the tree is stored with the file. The tree requires 512 bytes - which explains why short files are not compressed as much as longer files and why SqueeZ~88 will not attempt to process a short file - the table takes up more room than would be saved by Squeezing the file.

How well does SqueeZ~88 perform?

In our example, the Squeezed file was eleven bits or two bytes (there being eight bit in a byte) as opposed to the length of the input file, which was four bytes as each character normally requires one byte of your precious Z88 memory. This reduction by 50% is quite typical of SqueeZ~88 although the precise factor depends on the frequency of different characters within the file. Files which contain many of the same characters will be Squeezed better than those with a more even distribution.

Pipedream files tend to contain many spaces, Enter and "%" characters (which indicate the start of formulae, amongst other uses). BASIC programs will not be Squeezed very much as they are already compacted when the Z88 saves them - so there is a limit to how much information can be stored on your Z88!

How does encryption work?

The security encryption feature of SqueeZ~88 operates by jumbling the branches of the decoding tree. This means that encrypted files take no more room than Squeezed files - clever, eh?

*To obtain SqueeZ~88,
please see the advert elsewhere in this issue.*

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